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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Shinichi Uda

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EXAMINER

HUHN, RICHARD A

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

10/14/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/583,564	Applicant(s) UDA ET AL.	
	Examiner RICHARD A. HUHN	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11 August 2009 has been entered.
2. Any rejections and/or objections made in the previous Office action and not repeated below are hereby withdrawn.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Claim Objections

4. Claim 1 is objected to because of the following informalities: claim 1 recites the limitation "carrying out a reversed phase suspension polymerization in multi-steps of at least two steps..." in the third and fourth lines of the claim. However, the phrases "multi-steps" and "at least two steps" are redundant, because a process with multiple steps necessarily has at least two steps. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,180,798 (herein "Nakamura") in view of US Patent No. 6,335,406 (herein "Nagasuna").

8. As to claim 1: Nakamura discloses a process for preparing a water-absorbent resin comprising carrying out a reversed phase suspension polymerization in multiple steps (see col 3 line 1) wherein the water-absorbent resin is prepared by subjecting a (meth)acrylic acid (see col 3 line 47) or an alkali metal salt thereof (see col 3 line 48) to the reversed phase suspension polymerization.

9. Nakamura fails to specifically name the amount of water-soluble substance in the water-absorbent resin prepared by the method disclosed therein. Nakamura further fails

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to disclose the addition of a phosphorus-containing compound to at least one of the second or subsequent steps, but not to the first step, as is presently recited.

10. Nagasuna discloses that water-absorbent resins (see col 1 line 13) made by reversed phase suspension polymerization (see col 8 line 37) of (meth)acrylic acid or an alkali metal salt thereof (see col 5 line 27) may be prepared in the presence of a phosphorus-containing chain transfer agent (see col 6 line 37). Nagasuna further discloses that the amount of phosphorus-containing chain transfer agent is controlled to achieve a desired water absorption and durability of the water-absorbent resin (see col 6 lines 52 and 55).

11. In view of Nagasuna, a person of ordinary skill and creativity would know that water-absorbent resins could be made by reversed phase suspension polymerization in the presence of a phosphorus-containing chain transfer agent. Therefore, a person of ordinary skill and creativity would have been motivated to use a phosphorus-containing chain transfer agent in similar polymerization methods, including the method of Nakamura, in order to control the water absorption and durability of the water-absorbent resins. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have added a phosphorus-containing compound, such as a phosphorus-containing chain transfer agent, to any of the steps of the process of Nakamura, including only the second step as is presently recited, thereby arriving at the presently claimed invention.

12. Regarding the limitation of the amount of water-soluble substance in the water-absorbent resin: it is noted that this limitation is functional language, and it therefore

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only limits the process to the extent that the process suggested by Nakamura and Nagasuna be *capable* of producing a water-absorbent resin with at most 20 % by weight water-soluble substances. Because the process suggested by Nakamura and Nagasuna, as set forth above, contains all of presently recited steps, the process must be capable of producing a water-absorbent resin with at most 20 % by weight water-soluble substances. Additionally, it is noted that Nakamura discloses several comonomers (see col 3 lines 45-65) and crosslinking agents (see col 4 lines 35-54). A person of ordinary skill would be motivated to adjust the specific monomer composition in order to achieve desired physical properties of the water-absorbent resin, including the amount of water-soluble substance. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have used an appropriate monomer composition for the resins of Nakamura to achieve desired physical properties of the water-absorbent resin, including an amount of water-soluble substance of at most 20 % by weight, as is presently recited.

13. As to claim 2: Nagasuna specifically names sodium hypophosphite (see col 6 line 38).

14. As to claim 3: Nagasuna further discloses that the phosphorus-containing chain transfer agent is used in about 0.005 mol% based upon 1 mol of the monomer (see col 6 line 44).

15. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Application No. H09-012613 (herein "Ito"). A computer-generated

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English translation of Ito was provided with a previous Office action, and is referred to herein.

16. This rejection was adequately set forth in paragraphs 6-10 of the Office action mailed on 13 May 2009, as is incorporated here by reference.

17. Regarding the present limitation of the monomers (meth)acrylic acid or an alkali metal salt thereof: It is noted that Ito uses (meth)acrylic acid or salts thereof as the monomers (see claim 5, and paragraph 18).

18. Regarding the limitation of the amount of water-soluble substance in the water-absorbent resin: it is noted that this limitation is functional language, and it therefore only limits the process to the extent that the processes disclosed or suggested by Ito be *capable* of producing a water-absorbent resin with at most 20 % by weight water-soluble substances. Ito discloses that several monomers may be used (see paragraph 18), and that the monomer composition (see paragraph 20) and the degree of neutralization of the (meth)acrylic acid monomers (see paragraph 21) may be adjusted. Therefore, it appears that resins within the full scope of Ito do have a content of water-soluble substances of at most 20 % by weight, as is presently recited.

19. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,294,686 (herein "Fiarman") in view of Ito.

20. As to claim 1: Fiarman discloses a process of preparing a water-absorbent resin comprising carrying out a polymerization of acrylic acid and its sodium salt in two steps (see example 3 in col 7), wherein a phosphorus-containing compound (see sodium

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hypophosphite at col 7 line 34) is added to the second step, without the presence of the phosphorus-containing compound in the first step (see col 7 line 52 for the addition of the sodium hypophosphite at the beginning of the second step).

21. Fiarman fails to specifically name the use of a reversed phase suspension polymerization, as is presently recited. Fiarman further fails to specifically name the amount of water-soluble substance in the resin.

22. Regarding the limitation of the amount of water-soluble substance in the water-absorbent resin: it is noted that this limitation is functional language, and it therefore only limits the process to the extent that the processes disclosed or suggested by Fiarman be *capable* of producing a water-absorbent resin with at most 20 % by weight water-soluble substances. Fiarman discloses that several monomers may be used (see col 3 lines 50 to col 4 line 1), and that the monomer composition (see col 4 lines 2-6) may be adjusted. Therefore, it appears that resins within the full scope of Ito do have a content of water-soluble substances of at most 20 % by weight, as is presently recited.

23. Ito discloses that water-absorbent resins may be made using a reversed-phase suspension polymerization in order to control the particle size of the resin (see paragraphs 1-4 and 13-14). In view of Ito, a person of ordinary skill would know that water-absorbent resins made from (meth)acrylic acid and its salts can be made by reversed-phase suspension polymerization in order to control its particle size and related properties, such as agglomeration of the resin, binding of the resin to a substrate, and ease of processability.

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24. Therefore, a person of ordinary skill would have been motivated to carry out the method of Fiarman using a reversed-phase suspension polymerization in order to control the water-absorbent resin's particle size and related properties. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to carry out the method of Fiarman using a reversed-phase suspension polymerization as taught by Ito, thereby arriving at the presently claimed invention.

25. As to claim 2: Fiarman discloses the compound sodium hypophosphite monohydrate (see col 7 line 40).

26. As to claim 3: Fiarman discloses the use of 0.315 mol of sodium hypophosphite monohydrate and 8.33 mol acrylic acid (see col 7 lines 37 and 39), giving a molar ratio of 0.038 mol of phosphorus-containing compound to 1 mol of monomer.

Response to Amendment

27. Applicant's amendment of claim 1 to recite an amount of water-soluble substance of at most 20% by weight, with support from the examples and Table 1 of the specification is acknowledged. Applicant's amendment of claim 1 to recite (meth)acrylic acid of an alkali metal salt thereof, with support from paragraphs 11 and 12 of the specification, is acknowledged.

Response to Arguments

28. Applicant's arguments filed 11 August 2009 (herein "Remarks") have been fully considered and they are persuasive in part.

29. Applicant argues (first full paragraph on page 4 of Remarks) that "[s]ince the Ito technology results in relatively large amounts of water-soluble substance, a person of ordinary skill in the art would not use Ito as a starting point in an attempt to decrease the amount of water-soluble substance in a disposable diaper or sanitary napkin." However, this argument does not seem to logically follow from the teachings of Ito. It is acknowledged that Ito does not anticipate the present process. Even if the resins of Ito do not have the desired level of water-soluble substance, a person of ordinary skill who wanted to decrease the amount of water-soluble substance would be motivated to *modify* the process of Ito so as to effect this decrease. The process of Ito would therefore have to be the starting point for the person of ordinary skill who is trying to decrease the amount of water-soluble substance. The fact that Ito does not necessarily anticipate the present claims, including the presently recited amount of water-soluble substance, does not in itself make Ito an inappropriate starting point for a modified process that does have the presently recited amount of water-soluble substance.

30. Applicant questions (second full paragraph on page 4 of Remarks) why a person of ordinary skill would be dissatisfied with the hydrophilicity of the polymers of Ito, and what degree of hydrophilicity they would desire. It is noted that Ito discloses a variety of uses for the water-absorbent resins, including structural materials, soil water retention

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materials, and hygienic goods (see paragraph 1). Although the examiner is unwilling to speculate as to a specific degree of hydrophilicity that a person of ordinary skill would desire, it is clear from the variety of intended uses taught by Ito that the resins should have an appropriate hydrophilicity, water-absorption, water-solubility, and the like based upon the intended use of the material. For example, a person of ordinary skill would want such a resin, when used in structural materials, to not be greatly water-soluble, lest the material eventually dissolve away from the structural material.

31. Applicant further questions (third full paragraph on page 4 of Remarks) why it would be obvious to remove the chain transfer agent from the first polymerization step. A person of ordinary skill would be motivated to use less chain transfer agent in order to adjust the water-absorption, water-solubility, hydrophilicity, and the like, depending upon the application of the resin. A person of ordinary skill would have been equally motivated to remove the chain transfer agent from just the second step of the polymerization as from just the first step. This point was not made previously only because it would not lead to the claimed invention. The fact that a person of ordinary skill it would have been motivated to remove the chain transfer agent from just the second step does not in any way lessen the motivation to remove the chain transfer agent from just the first step.

32. Applicant further argues (page 5 of Remarks) that the claims have been limited in scope to make them commensurate in scope with the Declaration submitted on 18 March 2009. The claims now recite monomers which are commensurate in scope with the examples in the Declaration. Therefore, this argument is persuasive. However, upon

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reconsideration of the Declaration, it is noted that the example given uses both a different phosphorus-containing compound than Ito, and a different amount of the phosphorus-containing compound than Ito. The example in the Declaration (e.g. page 4 of the Declaration) uses 0.0019 mol of disodium phosphite pentahydrate per mol of acrylic acid, whereas the examples of Ito use 0.00064 mol of sodium phosphinate hydrate per mol of acrylic acid. Therefore, the example in the Declaration uses about three molar times the amount of the phosphorous compound as the examples in Ito. One would therefore expect the resins made by the example in the Declaration to possess greater water-absorption, amount of water-soluble substance, hydrophilicity, and the like than the examples of Ito, because they contain more of the polar phosphorus-containing groups. Also, it is unclear how the properties of the resin would change due to the use of a different chain transfer agent. The examiner regrets that these points were not raised earlier. However, the evidence provided in the Declaration is found unpersuasive because it is not comparative with Ito (MPEP 716.02(e)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD A. HUHNS whose telephone number is (571) 270-7345. The examiner can normally be reached on Monday to Friday, 8:30 AM to 6:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. A. H./
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796